

4.3.4 Tension Tests and Results

The last set of data collected for this experiment was the tension tests. These tests were conducted in accordance with ASTM A370-03a. The purpose of these tests was to determine the extent of corrosion in general, and pitting corrosion in particular. The tension test procedure was discussed in detail in Section 3.7.3. The data from the tension tests were collected and entered into a spreadsheet so that graphs could be developed for comparison purposes. A typical load deflection curve of the tension test data is shown in Figure 4.38. The most significant value on the graph is the peak load, which was used to compare the loss of cross section in various rebars. From these tension tests, a percent strength loss was calculated based upon the tension test data from a control bar. These graphs can be seen in Figures 4.39 and 4.40.

It should be stated that “strength loss” in this section actually refers to a reduction in peak load of the rebar caused by metal loss due to corrosion effects, not a strength loss based on material properties. The term “strength loss” is used in this section to differentiate between the tension tests and the chemical mass loss tests. Figure 4.39 shows that the specimen with no corrosion inhibitor product demonstrates the highest strength loss. This indicates that the specimens with corrosion inhibitors were more effective in preventing corrosion. However, this trend is not observed for many of the bath specimens. Despite this anomaly, several products do consistently show better results than that of the specimen with no corrosion inhibitor. There is however no apparent pattern to the usefulness of the products for the bath specimens.

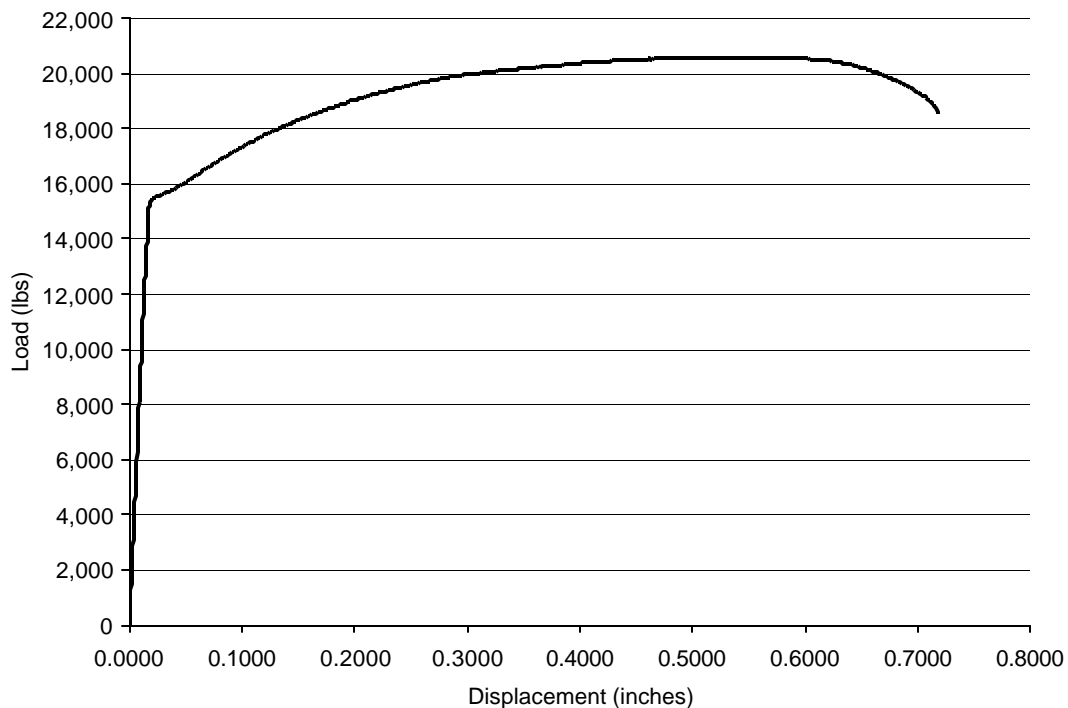


Figure 4.38 – Typical Load Deflection Curve for Bath 4, 0.0% Chloride, NO CI Specimen, Post-Cracked